Electronic Payment Instruments and Commercial Banks Dynamics: Empirical Evidence from Nigeria

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Abstract

This study examined the effects of electronic payment instruments on commercial banks dynamics in Nigeria. Time series data were sourced from Central Bank of Nigeria Statistical Bulletin, Stock exchange factbook and financial statement of the quoted commercial banks. The study modeled Return on equity and liquidity as the function of automated teller machine, point of sales, mobile payment and electronic fund transfer. Multiple regressions with econometrics view statistical package were used as data analysis techniques. Co-integration, Granger Causality Test and Augmented Unit Root Test were used to determine the long and the short run relationship that exist among the variables. The regression results found that the electronic payment instruments modeled in study explained 68 percent variations on return on equity and 88 percent variations on liquidity of Nigerian commercial banks.   Coefficient of the beta found that automated teller machines (ATM), point of sales (POS) and electronic fund transfer (ETF) have positive and significant effects on return on equity while mobile payment (MP) has negative and significant effects on return on equity. The study further revealed that automated teller machines (ATM),point of sales (POS) and electronic fund transfer have negative and significant effects on liquidity of commercial banks in Nigeria while mobile payment (MP) have positive and significant effects on liquidity of commercial banks in Nigeria. The stationarity shows that the variables are stationary at level; the granger causality test shows no causal relationship among the variables while the co-integration test shows at least four co-integrating equations. The study concludes that there is significant relationship between electronic payment instruments on the effectiveness of Nigeria commercial banks operations. The study recommends that Commercial banks in Nigeria should shift their focus to electronic payment and encouraged to continue investing in more modern electronic payment systems. The   study calls for the strengthening of commercial banks of Nigeria strategic policies measures to manage the negative side effects of electronic payment system on liquidity and that regulatory cum supervisory authorities should constantly review policies that are related to the promotion and adoption of electronic payment instruments in Nigeria.

Keywords: Electronic Payment Instruments, Dynamics, Commercial Banks, automated teller machines, point of sales and electronic fund transfer.

1.   Introduction

The complexity of financial service delivery as critical success factors of the emerging economy has become the focus of the regulatory authorities. The objective is to ensure that the industry meet customers' needs in quality ensure prudential financial stability and achieve a profitable banking system that maximizes shareholders wealth. Profitability is one of the indicators of performance of commercial banks. Electronic payment system is a product of information and communication technology and serves as a means of service delivery. It a salient features of today's banking environment that have modified the traditional bricks and mortar methods of bank service delivery that bridge distance and time barriers (Lucky, 2018). Information and communication technology has in specific brought a strong paradigm move on the performance of banking sector to catch up the global development by improving the quality of services delivered to the customers and through the reduction in cost (Aliyu and Tasmin, 2012). Technological follow ups like the ATMs, Electronic Funds Transfer at Point of Sale (EFTPOS), internet banking, SMS alert, credit cards and debit cards have graced the banking environment.

Electronic payment systems are the instruments, organizations, operating procedures, information and communication systems employed to initiate and transmit payments from a payer to a payee and for settling payments that is, transfer money (Imafidon, 2013). Electronic payment systems are related collection of structure of instruments for settling payments and transactions or part thereof. The electronic payment instruments consist of the ATM, POS, mobile money and internet banking, among others. From an economic perspective, efficient and safe payment systems are important insofar as they facilitate real and financial transactions in advanced economies. Their production is subject to economies of scale due to the significant investment in infrastructure needed to start the operation (large fixed costs) and the relatively small marginal cost of services provided using the existing infrastructure.

The paradigm of whether the profitability of banking sector influenced by the information technology advancements or not is still not clear because of the difference in econometrics methodologies and measurement (Shirley and Mallick, 2006; Berger 2003, Akani,Lucky and Uzah,2016, Tom, 1998). It can be argued that Nigeria is lagging behind when it comes to adoption and use of modern electronic payments systems. According to the Global FINDEX Survey, around one-third of Brazilians and South Africans with debit cards use e-payments, compared with one in ten Nigerians. The 2% of Nigerian adults who currently use e-payments represent a small fraction of the 19% holding debit cards. Similarly, data from EFInA's Access to Financial Services in Nigeria 2012 survey (A2F,2012) highlight Nigerians' limited adoption of electronic payments such that only 0.7% of banked adults use POS terminals, 0.8% of banked adults use the internet, and less than 2.5%using mobile phones for banking transactions. From the above this study examined the effect of electronic payment system on dynamic of Nigeria commercial banks. The paper proceeds as follows. Section 2 review literature on electronic payment system, section 3 describes the empirical methodology and summarizes the data. Section 4 reports the empirical results. The final section contains conclusion and recommendation.

2. Literature Reflections

2.1 Electronic Payment System

An electronic payment system refers to cash and associated transactions that are implemented using electronic means (Humprey et. al, 2001). The use of the internet and digital stored value systems are typical in this regard, thereby allowing bill payments or debit transfers done directly from the bank Agimo (2004) defined an electronic payment system as that payment by direct credit, electronic transfer of credit card details, or some other electronic means as opposed to payment by check and cash. Accordingly, an electronic payment system is any means used to make payment using an electronic network such as internet.

3. Types of Electronic Payment Terminals

3.1 Automated Teller Machines

This is a combination of a computer terminal, with cash vault that allows a bank customer to access their funds by punching in a PIN (Humphrey et al, 2001). Most ATMs are located outside the bank

and on public places that are far away from home bank offices offering retail banking services to customers. In the banking halls, there are Point of Sale (POS) machines where the ATM cards are swiped and a customer can access their funds after punching the pin. The customers make deposits, view mini statements and pay their bills over the POS machines (Abor 2004).

Automated Teller Machine (ATM) has been considered as a standout amongst the most critical segments of e-managing an account framework. ATM is a terminal conveyed by a bank or any money related establishment which empowers the clients to withdraw money, make offset enquiries, request bank statements, exchange stores furthermore store money. The ATMs are essentially self-overhauled saving money terminals and are gone for giving quick and advantageous administrations to the bank's clients (Rasiah, 2010). Basically, it is an electronic terminal which gives clients the chance to acquire managing an account administration at whatever time. To withdraw money, make stores or exchange trusts between records, a purchaser needs an ATM card and an Individual Personal Identification Number (PIN).

 Rose (1999) described ATMs as an ATM combines a computer terminal, record-keeping system and cash vault in one unit, permitting customers to enter the banks book keeping system with a plastic card containing a Personal Identification Number (PIN) or by punching a special code number into the computer terminal linked to the bank's computerized records 24 hours a day. With the presentation of an ATM, banks have the capacity to serve customers outside the banking corridor on the grounds that ATMs are put inside or close to the banks furthermore outside the banks, for example, shopping centers, eateries, airplane terminals or wherever that individuals may accumulate. ATM is intended to deal with the most imperative capacity of a bank. With the introduction of ATMs, some limitations such as time and geographic location have been resolved (Hazlina et al, 2011).

3.2. Point-of-Sale Transfer Terminals (POS)

The POS system allows customers to make retail purchases with a check card. The card looks like credit card but does not function like it. The amount purchased is transferred immediately from the account of the debit card holder to that of the store (Malak, 2007). Point of Sale terminals are deployed to merchant locations where users slot their electronic cards through POS in order to make payments for purchases or services instead of using raw cash. As the POS terminals are online real-time, the customer's bank account is debited immediately for value of purchases made or services enjoyed. There are indeed alternatives to handling or transacting cash for transfers and for payments of goods and services purchased. These include: ATMs, mobile banking/ payments which can be done through the use of mobile phones for balance enquiry, fund transfer, bills payment, internet banking which can be used for instant balance enquiries, fund transfer, bills payment and other transactions. Most banks require you to have a token device for internet banking services in order to give some security for customers banking application. Yet, other alternative includes Point of Sale(POS) terminals which allow merchants access to card payments for sale of products and services such as recharge cards, bill payments, lottery tickets etc and finally there is electronic fund transfer through which one can transfer money electronically from his account to other account. Some banks also offer an instant electronic fund transfer service. However, most of these e-payment channels require you to have an ATM/ Debit card (Oyetade and Ofoelue, 2012

3.3. Electronic Transfer

It refers to electronic transfers which can be affected via the internet on (Personal Computers) PCs, laptops and other devices. Bank customers who have subscribed to internet banking can do basic banking transactions via the web. This is a product that enables users to conduct fund transfer, make payment or receive balance enquiries on their mobile phones. The Nigerian Interbank Settlement Scheme is an online platform where banks exchange value thereby enabling the performance of interbank transfer such as NEFT and NIBSS instant transferring funds between banks for single or multiple beneficiaries for individual amounts not exceeding N10million. NEFT transfers (National Electronic Funds Transfer), once affected works with the next available clearing session of CBN and is received in the beneficiary's account the same day or next working day, but NIBSS instant payments are immediate.

3.4. Mobile Payment

Essentially, Mobile Payment System introduced at the dawn of January 1, 2012 allows users to make payments with their GSM phones. It is a saving device and transfer system that turns GSM phone into a saving account platform, allowing owners to save money in it and also make transfers. The Point of Sale (POS) terminals are installed by businesses and connected to the Nigeria Inter Bank Settlement System for purposes of making payments during business transactions (Wikipedia2013). The study presented significant recommendation: availability of sufficient and well-functioning infrastructural facilities (notably Roads and Electricity), harmonization of fiscal and monetary policy, regular assessment of the performance of cashless banking channels (individually and collectively), consideration of the present state and structure of the economy, redesign of monetary policy framework and greater efforts towards economic growth whilst managing inflation. In conclusion, the shift towards a cashless Ogun State seems to be beneficial though it comes with high level of concerns over security and management of cost savings resulting from its implementation.

3.5. Real Time Gross Settlement

Real Time Gross Settlement (RTGS)RTGS refers to funds transfer systems where transfer of money or securities takes place from one bank to another on a real time and on a gross basis. Real time means payment transaction is not subjected to any waiting period and gross settlement means the transaction is settled on one on one bunching or netting with any other transaction. Once processed, the payments are final and irrevocable.

3.6. Credit Cards

Credit Cards These is defined by Pierce (2001) as a plastic card that assures a seller that a person using it has a satisfactory credit rating and that the issuer will see to it that the seller receives payment for the goods delivered. The process requires the card holder to go to retail outlets that have Zimswitch to buy their groceries and demand cash backs provided that the account of the card holder has sufficient funds.

3.7. Western Union

Western Union This is defined as money transfer systems were the funds are transferred electronically between countries from the sender to the receiver. The agents are paid a commission

for transferring the funds on behalf of Western Union. Western union's agents can only receive but not send money from abroad. They are only allowed to send money from one city to another.

4. Theoretical Reflections
4.1. Diffusion Theory

According to Fichman (1992) the innovation diffusion theory provides well developed concepts and a large body of empirical results applicable to others fields, such as study of technology evaluation, adoption and implementation. The diffusion theory provides tools that enable the evaluation of the diffusion of a technology and the identification of the factors that facilitate the adoption and implementation of Information and Communication Technology. These factors include the "characteristics of the technology, characteristics of adopters, and the means by which adopters learn about and are persuaded to adopt the technology (Rogers, 1995).

Likewise, most micro-level research has tried to identify the relevant factors of Information and Communication Technology diffusion at organizational level without considering the external environment. However, some authors focus on the relationship between internal and external factors, arguing that Information and Communication Technology systems are global networks that link organizations, customers and business partners around the world (Kim and Galliers, 2001). They used empirical evidence to show that Information and Communication Technology diffusion is determined by the interaction between these dimensions and the pervasiveness of Internet systems, showing that Information and Communication Technology diffusion cannot take place without considering both the internal and external context. Some scholars focused on the role of networks in the diffusion of Information and Communication Technology innovation.

Korteland and Bekkers (2008) for example examined the diffusion process of electronic service delivery to Dutch policy forces, noting that organizational, political and network characteristics have gained great importance. In fact, the diffusion of innovation among the different organizations is influenced by the degree to which organizations are linked by an interdependent network. In most cases, Information and Communication Technology support these processes, overcoming geographical barriers and stimulating team working and the formation of inter-governmental relationships and ultimately networks.

4.2. Transactions Cost Innovative Theory

The transaction cost innovation theory pioneered by Niehans (2006) advocated that the dominant factor of financial innovation is the reduction of transaction cost, and in fact, financial innovation is the response of the advance in technology which caused the transaction cost to reduce. The reduction of transaction cost can stimulate financial innovation and improvement of financial service. It states that financial innovation reduces transaction costs. Transaction costs Innovation theory is also relevant in this context: for instance, the use of Internet-connected Information Technology (IT) can substantially reduce a farm's transaction costs as it enables efficient coordination, management and use of information. Mobile, Internet-connected IT may further lower transaction costs as it provides also off-site access to the firm's internal database and other relevant sources of information. Consequently, reduction of operation costs through agency banking, internet banking and mobile banking may influence growth in profitability for the bank.

4.3. Technology Acceptance Model (TAM)

This theory was developed by Davis in 1986. The model was formally developed from the research conducted by Davis (1989) on technological issues. The result of this research led to the development of the Technology Acceptance Model (TAM). This model seeks to establish the relationship between individuals behavioural and the use of Information and Communication Technology (ICT). It is argued that the behaviour of individual influences his attitude towards adopting new technology. However attitude and perceived usefulness are both determined by ease of use. (Pedersen et al 2002) maintains that adopting the TAM model is based on knowing end-users requirements with respect to how easy and friendly the technology is presented. The theoretical background of this study is anchored on the diffusion of innovation theory, this theory attempt to explain how, why and the rate at which new ideas and technology spread across societies. According to the diffusion of innovation theory, the process of adopting new idea, product, behavior or technology does not necessarily occur simultaneously in a social system but that it is a process whereby some people are more readily disposed to adopting the innovation than others.

5.   Empirical Reflections

Odior and Banuso (2013) examined the challenges, benefits and prospects of cashless policy and their study found that some of the challenges that have the capacity to hamper the success of cashless policy are power supply and poor infrastructures to mention but a few. On the other hand, their study revealed that cashless policy will promote economic growth and provide banks with more liquidity for lending to needy sectors and contribute to eliminating corruption if the right infrastructure and trust is instituted. Muyiwa*et al.,* (2013) found that the introduction of cashless policy will contribute in reducing robbery incidences; attraction of more foreign direct investment and creation of employment. Oyewole*et al.,* (2013) examined electronic payment systems and its impact on economic growth in Nigeria, and their study found that e-payment system has a positive impact on economic growth in terms of real GDP and that the introduction of ATMs in doing financial transaction impacts directly on economic growth, while other forms of e-payment channels showed a negative impact on economic development.

Newstead (2012) examined the influence of cashless payment on economic growth and found a positive relationship between cashless payment and economic growth. Specifically, it was found that cashless transactions were growing twice as fast in developing economies as compared across the world. This assertion by Newstead was not supported with appropriate statistical figures, showing the pace of cashless growth in the developing economies as compared to figures of cashless growth in the developed economies. Mallat &Tuunainen (2008) examined the adoption of mobile payment systems by merchants and found that the main purpose of mobile payment adoption is to increase sales and reduce the costs of payment processing and showed a positive influence on business sales growth. But, it carries challenges such as: complexity of the systems, unfavorable revenue sharing models, lack of critical mass, and lack of standardization.

Cheng *et al.,* (2011) risk perception of the E-Payment Systems using adult consumers in Malaysia and found that e-payment systems impacts negatively on firm's sales growth; also they further found that E-payment system has positive influence on consumers purchase intentions. Echekoba and Ezu (2012) in a research carried out in Nigeria, observed that 68.2% of the respondent complained about long queues in the bank, 28.9% complained of bad attitude of teller officers

(cashiers) while 2.89%complained of long distance of bank locations to their home or work places. Likewise, in her 24th NCS national conference in December 2011, CBN data shows that 51% of withdrawal done in Nigeria was through Automated Teller Machine (ATM), while 33.6% was through Over the Counter (OTC) cash withdrawals and 13.6%through cheques. Payment was also done through point of sales machine (POS) which accounted for 0.5% and web 1.3%.Therefore, if the introduction of ATM in Nigeria cash withdrawals system reduced OTC withdrawal; then it will implies that introduction of cashless policy supported by application of information technology can achieve more to reduce over dependent on cash payment in the Nigerian economic system.

Adewoye (2013) empirically studied the impact of mobile banking on service delivery in the Nigerian Commercial Banks through the use of questionnaire. He found out that the introduction of e-banking services has improved banking efficiency in rendering services to customer. His findings shows that mobile banking improve banks service delivery in a form of transactional convenience, savings of time, quick transaction alert which has recuperate customer's relationship and satisfaction. Olorunsegun (2010) used cluster sampling technique to study the impact of electronic banking in Nigeria. He found that most banks in Nigeria have effective electronic banking systems that have improved customer's relationship and satisfaction. Though these and some other authors have carried out various studies in electronic banking in Nigeria, this study will add value by specifically examining how cashless policy has impacted on the profitability of banks using ROA and ROE as proxies for the performance of the selected banks covered by the study.

Oyewole, El-Mauda, Abba and Arikpo (2013) carried out a study on e-banking and bank performance in Nigeria. Panel data comprised annual audited financial statements of eight banks that have adopted e-banking and retained their brand name banking between 2000 and 2010 as well as macroeconomic control variables were employed to investigate the impact of e-banking on return on asset (ROA), return on equity (ROE) and net interest margin (NIM). Result from pooled OLS estimations indicate that e-banking begins to contribute positively to bank performance in terms of ROA and NIM with a time lag of two years while a negative impact was observed in the first year of adoption. It was recommended that investment decision on electronic banking should be rational so as to justify cost and revenue implications on bank performance.

Wali, Wright and Reynolds (2014) examined the impact of the cashless system on user's perception and retail marketing performance in Nigeria retail sector, using survey instrument (questionnaire) and randomly selected 550 samples as to generate data on the impact of cashless systems on user perception and retail marketing performance in Nigeria. The study revealed that the adoption of cashless policy impacted on marketing performance of retail outlets in Nigeria. Specifically, the study revealed that the use of point of sale terminal (POS) as an instrument of cashless policy has strong and positive relationship with profitability and sales volume of retail outlet. The study further found that the use of E-cash wallet influences customers purchase intention as well as impact on customers repeat purchase behavior.

Ogunlowore and Oladele (2014) empirically investigated the impact of electronic banking on the satisfaction of customers using GTB bank, Lagos as a case study. A total respondent of100 respondent was sampled using a carefully structured questionnaire. Data obtained were analyzed

using descriptive measures such as simple tables and percentages. The formulated hypotheses were validated using the chi-square statistical measure. The empirical result from the chi-square analysis revealed that electronic banking has significant relationship with customer satisfaction in GTB bank in particular and the general banking customers in general. The result also revealed that the introduction of electronic banking has enhanced bank profitability level. Finally, the results showed the application of electronic banking has increased the market share of banks in Nigeria.

Oloyede, Azeez and Aluko (2015) assessed the benefit of e-commerce and e-banking to the Nigerian economy. In particular, the study examined the impact of e-commerce and e-banking on economic growth in Nigeria, sampling 100 respondents selected from banks and the general public. The study employed non-parametric statistics measure such as chi-square in testing the formulated hypothesis. The results of the test established that e-commerce and e-banking have significant positive impact on the Nigerian economy. This, it does by enhancing a better transaction exchange and reduced time wasting and slowness associated paper business transactions. The results also showed that electronics commerce and electronic banking has led to easy access to global market leading to a huge gain from such global integration. Further examination of the results showed that the application of electronic commerce and electronic banking has ensured the promotion of effectiveness and efficiency in business transactions in Nigeria. Lastly, the results revealed that the adoption of e-commerce and e-banking has resulted to the overall economic growth in Nigeria. The authors recommended that the government should provide adequate infrastructures such as telecommunication and power infrastructures so that the gain from e-banking and e-commerce currently experienced could be sustained,(Akani and Yellowe, 2017).

Suberu, Afonja, Akande and Adeyinka (2015) studied the effect of cashless policy, saving and bank credit on Nigerian deregulated economy. Data were collected from secondary sources. The ordinary least square econometric technique was used to analyze the data. Findings from this study revealed that the marginal productivity coefficient of bank credit to the domestic economy is positive but insignificant. The implication is that banks credit did not affect the productive sectors sufficiently for the latter to impact significantly on the Nigerian economy. In view of this, the paper recommended that banks should be willing to give both short and long term loans for productive purposes as there would be more available funds with introduction of cashless policy, as this will eventually lead to economic growth. Also the regulatory body (CBN) should adopt a direct credit control that will be beneficial to the productive sector of the economy,(Akani and Momodu, 2016).

Igbara, Egbrenini, Fabian and Daasi (2015) examined the impact of cashless policy on small scale business in Ogoni land of River state, Nigeria. The study used the purposive sampling technique, 250 owners and operators of small scale businesses were selected and administered questionnaire. The data collected were coded and analyzed using frequency table and percentage, while regression analysis was used to test the formulated hypotheses using SPSS (Statistical Package for Social Sciences). The results indicate that: small scale businesses in Ogoni land are predominately occupied by sole proprietorship with meager income with a significant numbers of them having a very poor banking habit; it was also found out that small scale businesses statistically do not rely on heavy capital outlay; couple with the fact that provision of services is their main business activity that makes bank transaction, ATMs usage and online banking is of less or no significance since their transaction is grossly hinged on cash and carry basis the findings from the study also

suggest that operators of small scale business have zero tolerance to ICT usage in both the operations and transactions of their businesses; and this constitute a major challenge to the adoption of cashless policy in the study area and generally, there was a negative significant influence of the introduction of cashless policy on the operations and growth of small scale businesses in Ogoni land.

Oyewole, Abba, Gambo and Arikpo(2013) examined E-banking and bank performance in Nigeria using annual reports for 8Nigeria commercial banks for 11 years 2000-2010.The panel analysis consisting of both macroeconomic and bank variables showed similar results with that of Auda and Kingoo (2012)for Kenya. The study established that e-banking does not contribute to profitability within two years and a negative impact was found in the first year of adoption between e-banking and profitability,(Akani & Onyema, 2017)

Hernado et al. (2006) analyzed the commitment of the reception of a transactional site to financial execution utilizing an example of 72 Spanish commercial banks over the time of 1994-2002 and discovered a positive effect on benefit, which was like DeYoung et al. (2007) who found that web banks are more beneficial than non-web banks, however no particular was set aside a few minutes of noteworthy reality. Onay, Ozsoz and Helvacıoğlu (2008) inspected the commitment of web banking to banks' benefit of Turkish over the period (1995-2005). They figured out that web banking begins adding to banks' ROE with a period slack of two years affirming the discoveries of Hernando et al. (2006) while a negative effect was 16watched for one year slacked sham.

Malhotra and Singh (2009) analyzed the commitment of web banking to execution and danger following the experience of Indian commercial banks amid June 2007 and figured out that gainfulness and the offering of web banking does not have any noteworthy affiliation, which compared to the discoveries of DeYoung (2005) and Arnaboldi & Claeys (2010). Moreover, Mohammad and Saad (2011) inspected the commitment of electronic banking to the execution of Jordanian banks over the period (2000-2010) utilizing OLS regression and figured out that electronic banking has a noteworthy negative effect on banks execution which was like the discoveries of Delgado et al (2007) and Siam (2006).

Onay et al (2008) in their research on Turkish banks concluded that e-banking contributes positively to the profits of banks. As per their study, Internet has changed the dimensions of competition in the retail banking sector. It has also provided opportunities for emerging countries to build up their financial intermediation infrastructure. Investment in e-banking is a gradual process. The internet banking variable has had a positive effect on the performance of the banking system in Turkey. Siam (2006) examined the effect of e-banking on Jordanian banks and concluded that dominant part of the banks is giving services on internet through their websites. His discoveries showed that there is more attention on achieving e-banking than to fulfilling and satisfying customers' needs. He likewise concluded that there ought to be a well-articulated strategy in order to achieve success and acquire benefits over the long haul. De Younget al(2007) analyzed the effect of e-banking on the performance of banks by examining the US group banks' markets furthermore compared the performance of virtual snap and mortar manages an account with block and mortar banks. Their discoveries concluded that e-banking improved the productivity of banks, hence increasing their overall revenues.

6. METHODOLOGY

This applies to the error correction methodology to a regression model based on the relationship between electronic banking and dynamics of Nigeria commercial banks. The idea is to subject the variables to stationary lest and subsequently remove the non- stationary trends by differencing before regressing. This removes the possibility of the so-called spurious regression not have considered the problem of unit roots. As a result, the econometric methodology used in those studies did not account for non-stationarity in the data,(Johansen and Juselius 1990). Analysis here is primarily based on Engle and Granger (1987), and Engle and Yoo (1987). The idea is to determine the order of integration of the variables, that is, we test whether they are stationary in their levels or whether they have to be differenced once or more before they become stationary. Testing for unit roots is earned out by using an Augmented Dickey-Fuller (ADF) test. In order to examine the relationship between the dependent and the independent variables, the model for the study is hereby specified as follows:

$$ROE = f(ATM, POS, MP, EFT) \qquad\qquad 1$$

$$LIQ = f(ATM, POS, MP, EFT) \qquad\qquad 2$$

To have the estimable version of above equation, equation 1and 2 can be rewritten to have

$$ROE_t = \alpha_0 + \beta_1 ATM_{t-1} + \beta_2 POS_{t-2\beta} MP_{t-3} + \beta EFT_{t-4} + \mu_{it} \qquad\qquad 3$$

$$LIQ_t = \alpha_0 + \beta_1 ATM_{t-1} + \beta_2 POS_{t-2\beta} MP_{t-3} + \beta EFT_{t-4} + \mu_{it} \qquad\qquad 4$$

Where
ROE = Return on equity of commercial banks

LIQ   =   Liquidity of commercial banks

ATM   =   Automated Teller Machine   Transaction

POS   =   Point of Sales Transactions

MP   =   Mobile Money Payment

ETF   =   Electronic Fund Transfer

$\phi_0 \, \alpha_0$ = Constant

$\beta_1 - \beta_5$ = Coefficients of independent variables

μ_{it} = Error Term

A-priori, $b_{,} > 0$, $b_3 > 0$, $b_3 > 0$, $b_4 < 0$, $b_5 > 0$, \qquad\qquad 4

The analysis of short-run dynamics is often done by first eliminating trends in the variables, usually by differencing. The theory of co-integration development in Granger (1981) and elaborated in Engle and Granger (1987) addressed this issue of integrating short-run dynamics with long-run equilibrium.It is important to note that the usual starting point of ECM modeling is to assess the order of integration of both the dependent and independent variables in the model. The order of integration ascertains the number of time a variable will be differentiated to arrive at stationary. Dickey- fuller (DF), Augmented Dickey-Fuller (ADF) and Sargan - Rhargava Durban-Watson (SRDW) are the widely used lest for stationary for both individual time series and

residual from OLS regressions. Co-integration is based on the properties of the residuals from regression analysis when the series are individually non-stationary.The original co integration regression is specified as follows:

$$A_t = \alpha_0 + \alpha_1 \beta_1 + \lambda_1$$

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Where A represents the dependent variables, β stands for the independent variable, and I e is the random error term. a_n and a_j are intercept and slope coefficients respectively. To include the possibility of bi-directional causality, the reverse specification of equation 1 is considered. To provide a more defensive answer to the non-stationarity in each time series, the Dickey-Fuller (1979) regression is estimated as follows for a unit root:

$$\Delta e_t = -\lambda e_{t_{-1}} + W_t$$

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If X Equals zero e is non-stationary. As a result, A and B are not co-integrated. In other words, if X is significantly different from zero A and B is found integrated individually. Given the inherent weakness of the root test to distinguish between the null and the alternative hypothesis, it is desirable that the Augmented Dickey-Fuller (ADF) (1981) test be applied. The desirability is warranted because it corrects for any serial correlation by incorporating logged changes of the residuals. To be co-integrated, both A and B must have the same order of integration (Eagle and Granger, 1987 and Granger, 1986).The ADF regression is specified as follows:

$$\Delta e_t = \beta_o \lambda_{t-1} + \sum_{j=i}^{m} \beta_j \Delta \lambda_{t-1} + \mu_t$$

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Where Δ the first different operator and u. is, is the new random error term. M is the optimum number of lags needed to obtain "white noise". This is approximated when the DW value approaches 2.0 numerically. The null hypothesis of non-co-integration is rejected, if the estimated ADF statistics is found to be larger than its critical value at 1 or 5 or 10 per cent level of significance. If A, and B, arc found to be co-integrated, then there must exist an associated error-correlation Model (ECM), according to Engle and Granger (1987). The usual ECM may take the following form:

$$\Delta G_t = \sigma_o e_{t-1} + \sum_{j=1}^{T} \sigma_1 \Delta A_{t-j} + \sum_{j=1}^{T} \theta_j \Delta B_{t-j} + V_t$$

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Where Δ denotes the different operator CM is the error correction term, T is the number of lags necessary to obtain white noise and V, is another random disturbance *term.* If a_0CM is significantly different from zero, then A and B have long-Run relationship, the error-correction term $\left(e_{t-1}\right)$ depicts the extent of disequilibrium between A and B The HCM, reveals further that the change in A, not only depends on lagged changes in B, but also on its own lagged changes.

7. RESULTS AND DISCUSSION OF FINDINGS

Table 1: level series Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Electronic Payment and Return on Equity of Commercial Banks				
ATM	0.951013	1.015445	2.936548	0.0402
POS	1.425600	1.260332	3.131131	0.0014
MP	-0.028393	0.755737	-2.037570	0.0004
ETF	0.137053	0.041406	3.309992	0.0035
C	-12.91665	94.07955	-0.137295	0.8922
R-squared	0.683874	Mean dependent var		57.65815
Adjusted R-squared	0.589037	S.D. dependent var		48.96920
S.E. of regression	31.39240	Akaike info criterion		9.949422
Sum squared resid	19709.65	Schwarz criterion		10.28538
Log likelihood	-127.3172	Hannan-Quinn criter.		10.04932
F-statistic	7.211001	Durbin-Watson stat		1.132287
Prob(F-statistic)	0.000335			
Electronic Payment and Liquidity of Commercial Banks				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
ATM	-0.020091	1.550298	-0.012959	0.0098
POS	-0.947711	2.327642	-0.407155	0.0087
MP	2.669430	0.868988	3.071884	0.0066
ETF	-0.157282	0.307471	-0.511534	0.0052
C	71.74376	68.87007	1.041726	0.3113
R-squared	0.881285	Mean dependent var		57.65815
Adjusted R-squared	0.828522	S.D. dependent var		48.96920
S.E. of regression	20.27808	Akaike info criterion		9.118160
Sum squared resid	7401.609	Schwarz criterion		9.550105
Log likelihood	-114.0952	Hannan-Quinn criter.		9.246600
F-statistic	16.70290	Durbin-Watson stat		2.505942
Prob(F-statistic)	0.000001			

Source: Extract from e-view

Table 2: Unit Root test

Unit Root TEST at Level

Variable	ADF Stat	Mackinnon critical Value			Prob.	Order of int	Remark
		1%	5%	10%			
ROE	-1.585610	-3.752946	-2.998064		-2.638752	0.9990	1(0)	Not Stationary
LIQ	-1.374787	-2.656915	-1.954414		-1.609329	0.1530 0	1(0)	Not Stationary
ATM	-0.963378	-2.656915	-1.954414		-1.609329	0.2909	1(0)	Not Stationary
POS	-0.425490	-2.656915	-1.954414		-1.609329	0.7983	1(0)	Not Stationary
MP	-1.068874	-2.656915	-1.954414		-1.609329	0.9999	1(0)	Not Stationary
ETF	-2.858189	-2.692358	-1.960171		-1.607051	0.9977	1(0)	Not Stationary

Unit Root Test at first difference

Variable	ADF Stat	Mackinnon critical Value			Prob.	Order of int	Remark
		1%	5%	10%			
ROE	-7.601996	-2.660720	-1.955020		-1.609070	0.0000	1(I)	Stationary
LIQ	-7.758869	-2.669359	-1.956406		-1.608495	0.0000	1(I)	Stationary
ATM	-7.104434	-2.669359	-1.956406		-1.608495	0.0000	1(I)	Stationary
POS	-7.246630	-2.660720	-1.955020		-1.609070	0.0000	1(I)	Stationary
MP	-6.465699	-2.660720	-1.955020		-1.609070	0.0000	1(I)	Stationary
ETF	-5.456569	-2.674290	-1.957204		-1.608175	0.0000	1(I)	Stationary

Source: Extract from e-view

Table 3: Granger Causality Test.

Null Hypothesis:	Obs	F-Statistic	Prob.
Electronic Payment and Return on Equity of Commercial Banks			
ATM does not Granger Cause ROE	25	0.71251	0.5024
ROE does not Granger Cause ATM		0.39154	0.6811
POS does not Granger Cause ROE	25	1.36939	0.2771
ROE does not Granger Cause POS		1.06939	0.3620
MP does not Granger Cause ROE	25	2.64234	0.0959
ROE does not Granger Cause MP		0.30686	0.7392
ETF does not Granger Cause ROE	25	2.58394	0.1004
ROE does not Granger Cause ETF		1.17343	0.3297
Electronic Payment and Liquidity of Commercial Banks			
ATM does not Granger Cause LIQ	25	0.66445	0.5256
LIQ does not Granger Cause ATM		0.19996	0.8204
POS does not Granger Cause LIQ	25	0.79872	0.4637
LIQ does not Granger Cause POS		1.02680	0.3763
MP does not Granger Cause LIQ	25	1.08930	0.3556
LIQ does not Granger Cause MP		1.23406	0.3123
ETF does not Granger Cause LIQ	25	0.17413	0.8414
LIQ does not Granger Cause ETF		0.30747	0.7387

Source: Extract from e-view

Table 4: Co-integration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**	
Electronic Payment and Return on Equity of Commercial Banks					
None *	0.947253	205.8207	125.6154	0.0000	
At most 1 *	0.865956	132.2645	95.75366	0.0000	
At most 2 *	0.757907	82.02491	69.81889	0.0039	
At most 3	0.564850	46.56403	47.85613	0.0658	
At most 4	0.482716	25.76239	29.79707	0.1360	
Electronic Payment and Liquidity of Commercial Banks					
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**	
None *	0.947253	73.55619	46.23142	0.0000	
At most 1 *	0.865956	50.23963	40.07757	0.0026	
At most 2 *	0.757907	35.46088	33.87687	0.0321	
At most 3	0.564850	20.80164	27.58434	0.2884	
At most 4	0.482716	16.47907	21.13162	0.1981	

Source: Extract from e-view

Table 5: Normalized Co-integration Test

ROE	ATM	POS	MP	ETF	
0.006683	0.110408	-0.060245	-0.003442	0.006889	
LIQ	ATM	POS	MP	ETF	
0.298365	1.067356	-0.045376	3.745217	1.115836	

Source: Extract from e-view

Table 6: Error Correction Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
Electronic Payment and Return on Equity of Commercial Banks				
C	-0.504188	5.476735	-0.092060	0.9416
D(ROE(-1))	1.532036	0.472575	3.241889	0.1905
D(ROE (-2))	-0.310776	0.742651	-0.418468	0.7477
D(ROE (-3))	0.597482	0.618649	0.965785	0.5111
D(ATM(-1))	-1.124993	0.767392	-1.465994	0.3811
D(ATM(-2))	-0.917681	0.588781	-1.558611	0.3632
D(ATM(-3))	-0.518782	0.964166	-0.538063	0.6857
D(POS(-1))	1.501160	1.630866	0.920468	0.5263
D(POS(-2))	2.929544	1.049849	2.790443	0.2191
D(POS(-3))	1.666011	0.718273	2.319469	0.2591
D(MP(-1))	-3.614950	1.432549	-2.523439	0.2402
D(MP(-2))	-0.891927	1.194206	-0.746879	0.5916
D(MP(-3))	0.802764	2.469576	0.325061	0.7999
D(ETF(-1))	0.072161	0.222349	0.324540	0.8002
D(ETF(-2))	-0.018554	0.299214	-0.062008	0.9606
D(ETF(-3))	0.061322	0.402484	0.152358	0.9037
ECM(-1)	0.394477	0.632802	0.623380	0.6451
R-squared	0.992165	Mean dependent var		9.987826
Adjusted R-squared	0.827632	S.D. dependent var		27.53915
S.E. of regression	11.43349	Akaike info criterion		6.488520
Sum squared resid	130.7247	Schwarz criterion		7.574645
Log likelihood	-52.61798	Hannan-Quinn criter.		6.761678
F-statistic	6.030186	Durbin-Watson stat		1.292889
Prob(F-statistic)	0.312036			
Electronic Payment and Liquidity of Commercial Banks				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.842918	5.140481	1.720251	0.1237
D(LIQ(-1))	1.371078	0.414044	3.311432	0.0107
D(ATM(-2))	-0.596617	0.595339	-1.002147	0.3456
D(ATM(-3))	-0.537157	0.544734	-0.986092	0.3530
D(POS(-1))	0.281990	0.322856	0.873423	0.4079
D(POS(-2))	1.668405	0.784633	2.126352	0.0662
D(POS(-3))	1.221715	0.596556	2.047947	0.0747
D(MP(-1))	-3.888998	0.939560	-4.139171	0.0033
D(MP(-2))	-0.547439	1.320516	-0.414564	0.6894
D(ETF(-1))	-0.093891	0.175677	-0.534453	0.6076
D(ETF(-2))	-0.041844	0.060826	-0.687934	0.5109
D(ETF(-3))	-0.060803	0.065769	-0.924492	0.3823
ECM(-1)	-0.088448	0.354016	-0.249841	0.8090
R-squared	0.893980	Mean dependent var		9.987826
Adjusted R-squared	0.708445	S.D. dependent var		27.53915
S.E. of regression	14.87000	Akaike info criterion		8.484864
Sum squared resid	1768.936	Schwarz criterion		9.225404
Log likelihood	-82.57594	Hannan-Quinn criter.		8.671108
F-statistic	4.818385	Durbin-Watson stat		1.307170
Prob(F-statistic)	0.015675			

Source: Extract from e-view

8.   Discussion of Results

Table 1, presents the regression result on the effect of electronic payment system on the dynamic of Nigeria commercial banks. Evidence from the result proved that the electronic report instrument

modeled the study explained 68 percent variation on return on equity and 88 percent variation on liquidity of Nigerian commercial banks. F-probability confirms that the model is well specified while the Durbin Watson statistics found the presence of serial auto correlation. Coefficient of the beta found that ATM, POS and ETF have positive and significant effect on return on equity while MP has negative and significant effect on return on equity. This implies that increase on monetary value of ATM, POS and ETF will increase return on equity of commercial banks to a great extent while MP will reduce return on equity on a great extent. The positive effect of the variables confirms the a-priori expectation and justifies the objective of technological innovation and Schumpeter opinion on the effect of technology. However, the negative effect of MP on return on equity is contrary to expectation and could be blamed on low patronage of the instrument. Further, the result found that ATM, POS and ETF have negative and significant effect on liquidity of commercial banks. This implies that increase usage of the instrument will make commercial banks to be illiquid. This finding confirms the a-priori expectation. The use of electronic payment instrument is prone to frequent cash withdrawal. However, MP proved to negative effect on liquidity of commercial banks in Nigeria.

Table 2, validates the presence of stationarity of the variables at first difference which implies that the variables are integrated in the order of 1(I), this validates the test of cointegration (table iii) which proved the existence of long run relationship between the dependent variables and the independent variables. Table iv presents the granger causality test which found no causality from the dependent and the independent variables. Table v which presents the normalized co-integration test proved the direction of long run relationship between the dependent and the independent variables. The estimated error correction model proved adjustment speed of 39.4 percent and 8 percent

The major types of electronic payment systems used by Nigerian commercial banks are mobile banking, Electronic fund transfer, automated teller machine and point of sales terminal. The adoption of electronic payment systems has been encouraged following the benefits; convenience, offering of a variety of services, cost reduction, speed payment, security and accessibility which are prerequisite for effective banking system. From the study we conclude that electronic payment instruments have significant effect on commercial banks return on equity and liquidity in Nigeria.

9. Recommendations
Commercial banks in Nigeria should shift their focus to electronic payment and encouraged to continue investing in more modern electronic payment systems and new technologies as these would result in improved income streams and effective banking system.

The study recommends that management of commercial banks in Nigeria should formulate strategic measures to manage the negative effect of electronic payment system on liquidity of commercial banks to avoid the negative effect on liquidity.

The regulatory authorities should constantly review policies that are related to the promotion and adoption of electronic payment systems that affect commercial banks. In this way, it is believed that scarce resources (money) can be efficiently allocated and utilized thereby positively affecting the effectiveness of banking transactions.

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